Claims

1. An antibody or fragment thereof that binds with high binding affinity to a YYX epitope of a mammalian PrP^{Sc}.

2. The antibody of claim 1, wherein said antibody does not substantially bind PrP^{C}.

3. The antibody of claim 1, wherein said antibody binds to a YYR epitope of a mammalian PrP^{Sc}.

4. The antibody of claim 1, wherein said antibody is a polyclonal antibody generated against a YYR epitope of PrP^{Sc}.

5. The antibody of claim 4, wherein said YYX epitope is part of CYYR (SEQ ID NO: 32).

6. The antibody of claim 1, wherein said antibody is a monoclonal antibody generated against a YYR epitope of PrP^{Sc}.

7. The antibody of claim 6, wherein said YYR epitope is part of CYYRRYYRYY (SEQ ID NO: 33).

8. The antibody of claim 1, wherein said antibody is an IgG, IgM, IgE, IgD, or IgA.

9. The antibody of claim 1, wherein said antibody fragment is a Fab or Fv fragment.

10. A hybridoma cell line that produces a monoclonal antibody that binds with high binding affinity to a YYX epitope of a mammalian PrP^{Sc}.

11. The hybridoma of claim 10, wherein said antibody does not substantially bind PrP^C.

12. The hybridoma cell line of claim 10, wherein said antibody binds to a YYR epitope of a mammalian PrP^{Sc}.

13. The hybridoma cell line of claim 12, wherein said YYR epitope is part of CYYRRYYRYY (SEQ ID NO: 33).

14. A composition comprising the antibody of claim 1.

15. The composition of claim 14, wherein said composition further comprises a carrier.

16. The composition of claim 14, wherein said composition is a therapeutic composition.

17. An immunological test kit comprising the antibody of claim 1 and a means for detecting said antibody.

18. A method for detecting PrP^{Sc} in a biological sample, said method comprising the steps of:

(a) contacting said biological sample with the antibody of claim 1 under conditions that allow for complex formation between said antibody and PrP^{Sc}; and

(b) detecting said complexes as an indication that PrP^{Sc} is present in said biological sample.

19. The method of claim 18, wherein said antibody does not substantially bind PrP^C.

20. The method of claim 18, wherein said antibody is a polyclonal antibody or fragment thereof.

21. The method of claim 18, wherein said antibody is a monoclonal antibody or fragment thereof.

22. The method of claim 18, wherein said biological sample comprises a tissue or cell, a tissue or cell extract, a bodily fluid, or a biopsy.

23. The method of claim 18, wherein said PrP^{Sc} is from a human, a livestock species, or a pet species.

24. The method of claim 18, wherein said complex is detected using an ELISA, RIA, western blotting, immunopreciptation, or flow cytometry.

25. A method for treating or preventing a PrP^{Sc} disease in a mammal, comprising administering to said mammal an effective amount of the antibody of claim 1 in a pharmaceutically-acceptable carrier.

26. A peptide comprising a YYX, YYR, YYD, or YYQ amino acid sequence, said peptide having antigenicity as a PrP^{Sc}.

27. The peptide of claim 26, wherein said peptide is composed of 18 or fewer amino acids.

28. The peptide of claim 26, wherein said peptide is composed of 12 or fewer amino acids.

29. The peptide of claim 26, wherein said peptide is composed of 8 or

fewer amino acids.

30. The peptide of claim 26, wherein said peptide is composed of 5 or fewer amino acids.

31. The peptide of claim 26, wherein said peptide is fused to an immunogenic carrier.

32. The peptide of claim 26, wherein said immunogenic carrier is serum albumin, ovalbumin, keyhole limpet hemocyanin, 8map, or lysozyme.

33. The peptide of claim 26, wherein said peptide is the tripeptide having the amino acid sequence YYR.

34. A synthetic peptide having the formula:

$$A\text{-}Tyr\text{-}Tyr\text{-}B\text{-}(Tyr\text{-}Tyr\text{-}B)_n$$

wherein A is either any amino acid or is absent;
wherein B is either any amino acid or is absent; and
wherein n is from 0 to 10, inclusive.

35. The peptide of claim 34, wherein at least one of A and B is not Tyr.

36. The peptide of claim 34, wherein A or B are chosen from Ala, Cys, Asp, Glu, Phe, Gly, His, Ile, Lys, Leu, Met, Asn, Pro, Gln, Arg, Ser, Thr, Val, or Trp.

37. The peptide of claim 34, wherein said peptide is A-Tyr-Tyr-Arg (SEQ ID NO: 12) or a pharmaceutically acceptable salt thereof.

38. The peptide of claim 34, wherein said peptide is A-Tyr-Tyr-Gln (SEQ ID NO: 13) or a pharmaceutically acceptable salt thereof.

39. The peptide of claim 34, wherein said peptide is A-Tyr-Tyr-Asp (SEQ ID NO: 14) or a pharmaceutically acceptable salt thereof.

40. The peptide of claim 34, wherein said peptide is linked to an immunological carrier.

41. A synthetic peptide having the formula:

$$A\text{-}Tyr\text{-}Tyr\text{-}B\text{-}C\text{-}Tyr\text{-}Tyr\text{-}D\text{-}Tyr\text{-}Tyr\text{-}(Tyr\text{-}Tyr\text{-}B)_n$$

wherein A is either any amino acid or is absent;
wherein B is either any amino acid or is absent;
wherein C is either any amino acid or is absent;
wherein D is either any amino acid or is absent; and
wherein n is 0 to 10, inclusive.

42. The peptide of claim 41, wherein at least one of A, B, C, and D is not Tyr.

43. The peptide of claim 41, wherein A, B, C, or D are chosen from Ala, Cys, Asp, Glu, Phe, Gly, His, Ile, Lys, Leu, Met, Asn, Pro, Gln, Arg, Ser, Thr, Val, or Trp.

44. The peptide of claim 41, wherein A is Ala, Cys, Asp, Glu, Phe, Gly, His, Ile, Lys, Leu, Met, Asn, Pro, Gln, Arg, Ser, Thr, Val, or Trp, and B, C, and D are chosen from Arg, Gln, Asp, Glu, Phe, or Trp.

45. The peptide of claim 41, wherein said peptide is A-Tyr-Tyr-Arg-Arg-Tyr-Tyr-Arg-Tyr-Tyr (SEQ ID NO: 25) or a pharmaceutically acceptable salt thereof.

46. The peptide of claim 41, wherein said peptide is linked to an immunological carrier.

47. A method for generating an antibody that binds with high binding affinity to a mammalian PrP^{Sc}, said method comprising the steps of:

(a) providing a prion protein peptide comprising an accessible epitope having two or more amino acid side chains;

(b) immunizing a mammal with said prion protein peptide of step (a); and

(c) purifying said antibody from a tissue of said mammal or from a hybridoma made using said tissue.

48. The method of claim 47, wherein said antibody does not substantially bind PrP^{C}.

49. The method of claim 47, wherein said antibody is a polyclonal antibody or fragment thereof.

50. The method of claim 47, wherein said antibody is a monoclonal antibody or fragment thereof.

51. The method of claim 47, wherein said prion protein peptide comprises a YYX amino acid sequence.

52. The method of claim 51, wherein said prion protein peptide comprises a YYR or YYQ or YYD amino acid sequence.

53. The method of claim 47, wherein said prion protein peptide is composed of 18 or fewer amino acids.

54. The method of claim 47, wherein said prion protein peptide is composed of 12 or fewer amino acids.

55. The method of claim 47, wherein said peptide is composed of 8 or fewer amino acids.

56. The method of claim 47, wherein said peptide is composed of 5 or fewer amino acids.

57. The method of claim 47, wherein said prion protein peptide comprises the peptide of claim 34 or claim 41.

58. A vaccine against a PrP^{Sc} disease comprising a peptide of any one of claims 26, 34, or 41 and a pharmaceutically-acceptable carrier.

59. A method of immunizing a mammal against a PrP^{Sc} disease, comprising administering an effective amount of the vaccine of claim 58.

60. A composition comprising the peptide of any of claims 26, 34, or 41.

61. The composition of claim 60, wherein said composition is a therapeutic composition.

62. A method for decontaminating PrP^{Sc} from a biological sample, said method comprising the steps of :

(a) treating the biological sample with an antibody of claim 1 for a period of time sufficient to permit the formation of an anti-PrP^{Sc} antibody:PrP^{Sc} complex; and

(b) recovering said anti-PrP^{Sc} antibody:PrP^{Sc} complex from said biological sample.

63. The method of claim 62, wherein said biological sample is a tissue, bodily fluid, or organ.

64. The method of claim 62, wherein said biological sample is perfused with said antibody

65. A method of inhibiting PrP^{SC} in a biological sample, said method comprising:

treating the biological sample with an antibody of claim 1 for a period of time sufficient to permit the formation of an anti-PrP^{Sc} antibody:PrP^{Sc} complex.

66. The method of claim 65, wherein said biological sample is a bodily fluid, a tissue or organ.

67. The method of claim 65, wherein said biological sample is perfused with said antibody.

68. A method for identifying a candidate compound for the treatment of a prion disease, said method comprising:

(a) measuring the binding of an anti-YYX antibody to PrP^{Sc} in the presence of a test compound; and

(b) measuring the binding of said anti-YYX antibody to PrP^{Sc} in the absence of said test compound;

wherein a level of binding of said anti-YYX antibody to PrP^{Sc} in the presence of said test compound that is less than the level of binding of said anti-YYX antibody to PrP^{Sc} in the absence of said test compound is an indication that said test compound is a potential therapeutic compound for the treatment of a prion disease.

69. The method of claim 68, wherein the anti-YYX antibody is an anti-YYR antibody, anti-YYD antibody, or an anti-YYQ antibody.

70. The method of claim 68, wherein said prion disease affects a human, a livestock species, or a pet species.

71. The method of claim 68, wherein said prion disease affects a human, bovine, sheep, or goat.

72. The method of claim 68, wherein said test compound is a small molecule.

73. A compound identified according to the method of claim 68.

74. A method for identifying a compound for diagnosing a prion disease, said method comprising:

(a) measuring the binding of an anti-YYX antibody to PrP^{Sc} in the presence of a test compound; and

(b) measuring the binding of said anti-YYX antibody to PrP^{Sc} in the absence of said test compound;

wherein a level of binding of said anti-YYX antibody to PrP^{Sc} in the presence of said test compound that is less than the level of binding of said anti-YYX antibody to PrP^{Sc} in the absence of said test compound is an indication that said test compound is a potential compound for diagnosing a prion disease.

75. The method of claim 74, wherein the anti-YYX antibody is an anti-YYR antibody, anti-YYD antibody, or an anti-YYQ antibody.

76. The method of claim 74, wherein said prion disease affects a human, a livestock species, or a pet species.

77. The method of claim 74, wherein said prion disease affects a human, bovine, sheep, or goat.

78. The method of claim 74, wherein said test compound is a small molecule.

79. A compound identified according to the method of claim 74.

80. An antibody produced according to the method of claim 47.